



# United States Department of the Interior

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Consultation # 2-15-F-2003-0469

Dear Mr. West:

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the proposed Texas Department of Transportation (TxDOT) reconstruction and rehabilitation of a 13-mile (21-kilometer) section of Farm-to-Market Road (FM) 170 between Terlingua and Lajitas in Brewster County, Texas (CSJ 0957-10-012) and its effects on the federally listed threatened Lloyd's Mariposa cactus (*Sclerocactus* (= *Echinomastus* = *Echinocactus*) *mariposensis*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*). Your September 15, 2003, request for formal consultation was received on September 15, 2003.

This Opinion is based on information provided in the September 3, 2003, Biological Assessment and the July 2003 Categorical Exclusion document. This Opinion is also based on meetings, emails, and telephone conversations between individuals from TxDOT and the Service. A complete administrative record of this consultation is on file at this office.

## Consultation History

In March 2003, Karen Clary (TxDOT) and Jenny Wilson (Service) discussed potential impacts of the proposed highway construction project, FM 170 between Terlingua and Lajitas, Texas, on the Lloyd's Mariposa cactus. Because two populations of Lloyd's Mariposa cactus plants occupy areas that would be destroyed by road construction, it was agreed that formal section 7 consultation would be warranted.

On June 13, 2003, an interagency meeting was held at the Barton Warnock Center in Lajitas, Texas to discuss potential impacts to the Lloyd's Mariposa cactus from this project and to view the project site. During the meeting TxDOT proposed several conservation measures. The



meeting participants discussed these and most were included in the project description. Meeting participants included: Karen Clary; Deena S. Gantt, Tom Mangrem, and Chris Weber, Alpine Area Office, TxDOT; Carlos Mendoza, Terlingua, TxDOT; Jackie Poole, Texas Parks and Wildlife Department; Kathy Rice, Desert Botanical Garden, Phoenix, Arizona; Joe Sirotnak, National Park Service, Big Bend National Park (BBNP); Mary Telles-Goins, El Paso District, TxDOT; and Jenny Wilson.

## **BIOLOGICAL OPINION**

### **Description of the Proposed Action**

#### Project Description

The El Paso District of the TxDOT is upgrading FM 170 in Brewster County by reconstructing and rehabilitating a 13-mile (21-kilometer) section of roadway from 0.70 mile (1.1 kilometers) west of Lajitas to Terlingua (Figure 1). Improvements to FM 170 are proposed to increase road safety and to bring the roadway up to current design standards. This section of FM 170 was constructed in 1958 and only minor improvements have been made since that time. Currently, this section is a two-lane farm-to market road that functions as an east-west rural major collector. The existing roadway lies within a 120-foot (36.6-meter) right-of-way (ROW) and consists of one 10-foot (3-meter) travel lane in each direction and 4-foot (1.2-meter) bladed dirt shoulders with an adjacent 10-foot (3-meter) graded clear zone.

Local traffic in Lajitas and Terlingua has increased with population growth since the road was designed in the 1950s and the existing road conditions make the facility increasingly inadequate to handle the traffic as well as costly to maintain. Narrow travel lanes, limited sight distances around hills and curves, low water crossings that flood after rains, and the lack of a paved shoulder pose safety concerns for the traveling public. The road is also load limited because of poor base conditions.

As FM 170 would be rebuilt for safety reasons rather than to accommodate or promote added capacity, it is expected that the amount of traffic on the roadway would not increase as a result of the new construction. Current information on the Average Daily Traffic (ADT) count for this segment has changed little over the past decade. It has fluctuated between a low of 250 vehicles in 1992 to a high of 770 in 1994. ADT for 2001, the most recent year for data, was 540 vehicles per day. Design year 2021 ADT is projected to be 760 vehicles per day.

The proposed improvements would include widening the existing 68-foot (20.7-meter) roadway (including the clear zone) to 72 feet (22 meters), rehabilitating the existing deteriorating road bed, widening the two 10-foot (3-meter) travel lanes to 12 feet (3.6 meters), paving the existing 4-foot (1.2-meter) bladed dirt shoulder, moving the existing 20-foot (6.1-meter) clear zone out 2 feet (0.6 meter) on each side of the road, and reducing the horizontal and vertical alignments (curves and grades) to increase sight visibility. All work would be performed within the existing 120-foot (36.6-meter) ROW in the early spring of 2004.

There are twelve existing culverts and ten low water crossings in the project area. Of the ten existing low water crossings, eight will be replaced with drainage structures during the proposed rehabilitation of the roadway. In addition, culverts will be added to 24 small water crossings. Bridge class structures are proposed for five existing low water crossings located at Trocha de Agua, Comanche Creek, Long Draw I, Long Draw II, and Long Draw III. During construction, temporary construction detour roads will be built within the right of way for Trocha de Agua, Comanche Creek, and the three Long Draw crossings to maintain traffic flow. Construction impacts from bridge and culvert work will include excavation, grading, placement of riprap, and placement of fill for approaches to structures. No internal pilings will be placed in the stream channels.

All stream channels in the project area are ephemeral and drain into the Rio Grande. There are no perennial streams or other water bodies, such as wetlands, within the project area. Impacts to existing vegetation at the stream crossings will be minimal as the existing culverts and low water crossings are routinely maintained and there is little or no mature woody vegetation in the ROW. There will be a total of 5.02 acres (2.03 hectares) of fill material placed in channels throughout the project area. A pre-construction notification was filed with the U.S. Army Corps of Engineers due to the potential for discharges of dredged or fill material to cause a loss of greater than 0.1 acre (0.04 hectare) of waters of the United States. The fill has been authorized through Nationwide Permit (NWP) 3 - Maintenance and 14 - Linear Transportation Crossings.

### Conservation Measures

No mature trees would be removed. Prior to excavation and embankment operations in the few areas that sustain grasses, the topsoil will be windrowed aside. At the completion of the grading operations, the topsoil will be spread back across these sections. Environmentally sensitive areas would be identified and avoided and clearing of vegetation would be limited in order to minimize impacts to vegetation and wildlife during construction activities. Where possible, trees, shrubs, grasses, and other landscape features would be preserved and would be protected from abuse, marring, or damage during construction operations.

As a part of the proposed project, TxDOT has also included the following measures to benefit or promote the recovery of the Lloyd's Mariposa cactus:

- Kathy Price will collect 50 Lloyd's Mariposa cactus plants from the ROW during the spring of 2004, prior to commencement of construction activities. This includes at least 39 plants in the direct path of construction, any new plants within the construction area that were not counted during the original surveys, and enough plants from outside the construction area to equal 50. These plants will be moved to the Desert Botanical Garden, the National Plant Conservation Center's designated facility for Lloyd's Mariposa cactus and plant conservation, for seed production and conservation.
- An additional 50 plants would be removed from those remaining in population #1 by staff of the Sul Ross State University Biology Department, the TxDOT Alpine Area Office, and the

Desert Botanical Garden. These plants will be kept in the SRSU Biology Department's greenhouses for future conservation, propagation, and research. A minimum of 50 plants in a breeding population is considered sufficient to sustain population size levels for genetic variation (Kathy Rice, personal communication).

- TxDOT will exclude all unnecessary activity in Lloyd's Mariposa cactus habitat by:  
1) preparing an Environmental Permits, Issues and Commitments (EPIC) Sheet to include in the construction contract, 2) conducting a pre-construction meeting to provide all parties with the avoidance measures to be employed during all phases of construction and to identify appropriate staging areas outside of Lloyd's Mariposa cactus habitat, 3) designing final project grades to make Lloyd's Mariposa cactus plants that remain in the project ROW more inaccessible to vehicular traffic and uninviting to pedestrian traffic, 4) avoiding use of such features as fencing or signage that would draw attention to Lloyd's Mariposa cactus or its habitat
- TxDOT Alpine Area Office maintenance staff would conduct routine monitoring of the Lloyd's Mariposa cactus areas after construction and would notify the TxDOT Alpine Area Office Engineer of any damage or threats that might occur to the remaining population.
- TxDOT Alpine Area Office would ensure that the remaining Lloyd's Mariposa cactus habitat is protected from future disturbance from utility line placement or other ROW maintenance and construction activities. This would include preparing a document package to be given to any utility company planning work inside the ROW that would help them avoid impacts to the Lloyd's Mariposa cactus and meetings to resolve any environmental issues.
- TxDOT would encourage repopulation by species native to the site, including the Lloyd's Mariposa cactus, by utilizing the existing seed bank to revegetate the area. In addition, maintenance staff would remove any non-native, non-habitat specific plants including weeds, exotics, and invasive plants.

## **Species Description and Status**

### Lloyds' Mariposa Cactus

#### Description

The Lloyd's Mariposa cactus was federally listed as threatened on November 6, 1979, without critical habitat. It is also listed as a threatened species in Texas on April 29, 1983. This species is known from the Big Bend Region of southwestern Texas and from adjacent Coahuila, Mexico.

Lloyd's Mariposa cactus consists of a single, 1- to 4-inch (2.5- to 10.2-centimeter), egg-to-golf ball-shaped, blue-green, ribless stem approximately 1- to 2.5-inches (2.5- to 6.3-centimeters) in diameter. The 0.25-inch (0.63-centimeter) long, broad tubercles protrude 0.12 inch (0.3 centimeter) from the stem. The areoles are elliptic, 0.12-inch (0.3-centimeter) in diameter, and 0.25 inch (0.63 centimeter) apart. The spines, which distinguish this species from its closest relatives, are very thin and hide the stem. The 0-4 tan central spines have chalky blue or brown tips. The lower ones are 0.2 inch (0.5 centimeter) long and curve downward, while the upper

ones are 0.6-0.8 inch (1.6-2.0 centimeters) long, needle-like, and curve upward. There are 25-35 white-to-gray, straight, needle-like outer spines, which are 0.2-0.4 inch (0.5-1.0 centimeter) long, spread evenly and parallel to the stem, and are arranged like the teeth of a comb (Poole and Riskind 1987).

The flowers of the Lloyd's Mariposa cactus are pale green to pale pink, 1.25 inches (3.17 centimeters) long, and 1.5 inches (3.8 centimeters) in diameter. The outer "petals" are greenish or reddish purple in the center, with pink margins. The inner "petals" are pink or yellowish tan with white margins. The stamens are cream to pink. The stigma is green with 5-8 lobes. The fruit is yellow-green when dry. The top of the fruit is 0.4 inch (1.0 centimeter) long, round or oblong, and splits open on one side. The seeds are black, warty, egg-shaped, and about 0.06 inch (0.15 centimeters) long (Poole and Riskind 1987).

Lloyd's Mariposa cactus occurs in relatively high densities on suitable outcrops of Late Cretaceous limestone in the Big Bend area of Brewster County, Texas and southeastward into Coahuila, Mexico usually at elevations between 2500-3500 feet (762-1067 meters) (Anderson and Schmalzel 1997). Formations on which it is found include the Santa Elena, Sue Peaks, Del Carmen, Telephone Canyon, Boquillas, Del Rio Clay, Glen Rose, Aguja, and Pen formations (USFWS 1989).

Distribution and habitat suitability of Lloyd's Mariposa cactus is not narrowly specific. In addition, the distribution does not seem to depend greatly on temperature, nor does it occur in a close alliance with any associated plant species within the Chihuahuan Desert (Anderson and Schmalzel 1997). Lloyd's Mariposa cactus occurs mostly on hills and slopes, though it also grows on valley floors, where soils are shallow, rocky, and composed of crumbling limestone. Soil series include: Chamberino, Lajitas, Lozier, Mariscal, Pantera, Solis, Tornillo, and Upton-Nickel (USFWS 1989). Associated plant species consist of low shrubs and rosette forming perennials which include creosotebush (*Larrea tridentata*), lechugilla (*Agave lechuguilla*), ocotillo (*Fouquieria splendens*), leatherstem (*Jatropha dioica*), candelilla (*Euphorbia antisiphilitica*), boquillas silverleaf (*Leucophyllum candidum*), smooth sotol (*Dasylyrion leiophyllum*), rough falsegave (*Hechtia scariosa*), woolly butterflybush (*Buddleia marrubifolia*), gypsum grama (*Bouteloua breviseta*), plume tequila (*Tiquilia greggii*), falsemesquite (*Calliandra conferta*), range ratany (*Krameria glandulosa* [*K. parvifolia* Benth]), fluffgrass (*Erioneuron pulchellum*), *Selaginella* sp., Boke's button cactus (*Epithelantha bokei*), living rock (*Ariocarpus fissuratus*), and bunched cory cactus (*Coryphantha ramillosa*) (USFWS 1989).

## Life History

Lloyd's Mariposa cactus flowers from February-early March to July and fruits form from April to August (McKinney 1998, Poole and Riskind 1987). If cross-pollinated, nearly all of the flowers produce fruits. Ripe fruits split open on one side, releasing the seeds that are believed to be dispersed by water, wind, and ants (USFWS 1989). The average number of seeds per fruit is 22 (USFWS 1989), although Anderson and Schmalzel (1997) documented fruits at their study

site in Big Bend National Park with as many as 90 seeds. Safe sites for seeds are generally under rocks or deep in the cracks of rocks where the seeds are protected from desiccation and predation (USFWS 1989).

As Lloyd's Mariposa cactus plants grow from seedling to reproductive maturity, they pass through at least four ontogenetic stages in spine arrangements for the tubercles. Juveniles have tubercles with one central spine oriented towards the apex and appressed to the plant. The next stage has two central spines, one oriented towards the apex, the other towards the base of the plant. The third and fourth stages have three and four central spines respectively (Anderson and Schmalzel 1997). At a study site in Big Bend National Park, it was found that all stage 1 plants and probably all stage 2 plants did not fruit. Over 70 percent of the stage 3 (N=19) and stage 4 (N=25) plants fruited (Anderson and Schmalzel 1997). Young plants were found to produce new tubercles in the late winter while adult plants produced flowers (and fruits) during this period and grew vegetatively outside the November to April time period (Anderson and Schmalzel 1997).

Using diameter as plant size, one study showed that Lloyd's Mariposa cactus plants did not begin to fruit until after they reached 1.2 inches (30 millimeters) in diameter (Anderson and Schmalzel 1997). McKinney (1998) found only four plants out of 156 flowering at less than 1.2 inches (30 millimeters) in diameter. However, height and diameter, the customary measurements taken for the determination of size class and growth of cactus, are generally inadequate to describe growth for plants like the Lloyd's Mariposa cactus. These cacti can shrink while growing (producing new tubercles) or swell while not growing (not producing new tubercles) (Anderson and Schmalzel 1997). Thus, they do not merely increase in height and diameter over time. Anderson and Schmalzel (1997) showed that plants could decrease in diameter during dry years and then respond rapidly to a wet spring by enlarging, growing, and flowering. Plants in their study increased up to 35 percent in volume during periods of abundant precipitation and decreased similarly during periods of drought.

Germinating Lloyd's Mariposa cactus seeds have not been observed in the field to date and seed persistence in the soil and growth and survival of the youngest plants, those less than 0.2 inches (5 millimeters) in diameter, is poorly understood (Anderson and Schmalzel 1997). In greenhouse conditions, seedlings were found to flower in six years (Steven Brack, personal communication as noted in Anderson and Schmalzel 1997). However, it may take twice that amount of time under near optimal conditions in the field. Under difficult conditions, Lloyd's Mariposa cactus plants may take 20 to 30 years to reach maturity (Anderson and Schmalzel 1997).

Little is known regarding the impact of disease or herbivory on Lloyd's Mariposa cactus plants. Anderson and Schmalzel (1997) found a snail eating the tissue of a Lloyd's Mariposa cactus plant that had lost the upper half of its body (and spines). This plant as well as others had been damaged and the tissue of the central and lower part of the plant had been scraped out. In some plants, they found only small areas where the spines had been removed at the top of the plants. They suggested that black-tailed jackrabbits (*Lepus californicus*) or desert cottontails (*Sylvilagus auduboni*) may have gnawed through the top of the plant and then opportunists like snails

(unknown sp.) fed on the exposed plant tissue. They also found dead intact vegetation of Lloyd's Mariposa cactus plants throughout their study areas but they did not open them to determine if insects played a role in the plants' deaths.

### Population Dynamics

Lloyd's Mariposa cactus has a patchy distribution. Where it is found, it occurs as scattered individuals or occasionally as dense colonies on the tops of small hills or on rocky flats below hills (USFWS 1989). Thus, it is difficult to determine the number of individuals within populations or to make realistic estimates about the total number of plants over the species entire range. Information on microhabitat requirements, demography of populations, and seedling establishment rates is also lacking. Some information suggests that Lloyd's Mariposa cactus has a good reproductive potential as it has come back in areas where all mature specimens were systematically stripped by commercial cactus harvesters (Weniger 1979).

### Status and Distribution

When the recovery plan was published, three populations from Brewster County and three populations from Coahuila, Mexico were known to exist (USFWS 1989). Since then, numerous additional populations have been located in the Chihuahuan Desert. Confirmed localities in Texas include the Terlingua-Lajitas area, BBNP, Black Gap Wildlife Management Area (BGWMA), the Lower Canyons of the Rio Grande Wild and Scenic River, and private ranches north of the BGWMA (Anderson and Schmalzel 1997, McKinney 1998). McKinney (1998) also suggests that plants may occur east into Terrell County but does not provide detailed maps or description documenting the actual location of those populations. In Mexico, the species occurs as far south as the Cuatrociénegas Basin and as far east as Cima de la Muralla, located south of Monclova, Coahuila, 233 miles southeast of Big Bend (Anderson and Schmalzel 1997).

The recovery plan lists threats to the Lloyd's Mariposa cactus as: 1) mining (mercury is still present in the Boquillas Formations and coal and petroleum are also found there), 2) Habitat disturbance by off-road vehicles in the Lajitas-Terlingua region, and 3) collecting. Modification/destruction of habitat from future residential development including vacation homes and ranchettes was also listed in the Federal Register as a potential threat to the Lloyd's Mariposa cactus. Ranching practices were not considered as threats to the plants at the time; however, future ranching practices were mentioned as potential effects.

Recovery measures for the Lloyd's Mariposa cactus include removing threats to the species by enforcing the existing regulations and management for protection, gathering information for use in management, developing a comprehensive trade management plan for all cacti, refining propagation techniques, establishing populations at the botanical gardens of research institutions, and developing public awareness and support for preservation of the Lloyd's Mariposa cactus. Goals for delisting included identifying at least three sites where the species can be protected with at least 1,000 plants and enough habitat to permit population expansion and growth at each site. The three areas identified for sustaining protected populations include private land in

northeastern Brewster County, Big Bend National Park, and Mexico. Delisting could occur when at least 20,000 plants are being sustained and managed across the three sites.

Recent monitoring studies and known element occurrence records indicate that the species is substantially more widespread in both range and population size than was originally thought at the time of listing and when the recovery plan was written. Poole (2003) estimates from 15,000 to 20,000 plants may exist across the range of the species however, less than half of the known occurrences include accurate population numbers (TxBCD 2003, Poole 2003). Seven populations containing approximately 300+ plants have been documented west of Terlingua, Texas (Poole 2003) and an additional 21 populations containing another 1,100+ individuals have been documented east of Terlingua (Poole 2003, McKinney 1998). Another four populations have been documented in Mexico; however, numbers of individuals were never recorded. Staff of the Desert Botanical Garden visited twelve occupied locations in the late 1990's (10 in Texas and 2 in Mexico) but only documented that all populations appeared to be healthy and consisted of both juveniles and adults (Anderson and Schmalzel 1997). At least 12 occurrences of Lloyd's Mariposa cactus have been documented within BBNP and two occur within BGWMA (McKinney 1998).

#### Analysis of Affected Species

There are 34 known populations of the Lloyd's Mariposa cactus in Texas with 15,000 to 20,000 individuals (Poole 2003). The proposed project would impact two of the seven currently known populations occurring west of Terlingua. A total of 139 plants were counted within the ROW and an additional 33 plants were noted immediately adjacent to the ROW.

### **Environmental Baseline**

#### Status of the Species Within the Action Area

The Service considers the action area to be the project limits bounded by the existing ROW, the properties adjacent to the existing ROW limits and the drainages that carry storm water from the project area to the Rio Grande. Two populations of Lloyd's Mariposa cactus exist within the action area. Population 1 consists of at least 153 plants and covers two acres (0.8 hectare) within the existing ROW. This population extends beyond the ROW onto the adjacent properties on both sides of FM 170. The extent of the population on private property was not determined because right of entry had not been obtained, however, the population may be continuous for some distance, as the geological formation upon which the plants occur is about five miles (8 kilometers) wide, and the area remains undisturbed by development. Population 2 occurs on both sides of the road and encompasses the type locality for this species. Cactus collectors have long known of this area, and the population appears to have been mostly extirpated from this location. A total of 19 plants were found. At least three plants and 0.10 acre (0.04 hectare) of suitable habitat occur within the construction area of the proposed project.

## Factors Affecting Species Environment Within the Action Area

### Habitat and Soils

The proposed project is located in the lower elevations (2,300 to 3,100 feet [701 to 945 meters]) of the Chihuahuan Desert in the Trans-Pecos ecological area of Texas. The topography along the project area varies from mildly sloped desert hills to moderately deep arroyos. Most of the proposed project passes across mild cross slopes of desert lowlands rising gradually in elevation eastward (2,300 to 2,960 feet [701 to 902 meters]). A one-mile (1.6-kilometer) section crosses the Reed Plateau over Thirty-eight Mile Hill to a project high elevation of 3,127 feet (953 meters).

The climate in the area is typical of the Chihuahuan Desert: semi-arid, characterized by moderately hot summers; mild winters; short, temperate spring and fall seasons; low humidity; and little rainfall. The annual rainfall of eleven inches (twenty-eight centimeters) is enough to maintain a sparse cover of desert vegetation and scattered grasses, low shrubs, and small trees in the arroyos. Dust storms and high winds are common in the spring. There are wide temperature fluctuations between night and day due to the thinner, dry desert air and the rapid nighttime cooling of desert soils.

The soil layer on the project is a mix of sedimentary and igneous rock derived from the Chisos, Boquillas, and Pen formations. Other formations, which occur sporadically throughout the project area, include Quaternary deposits of alluvium and low terrace deposits, and colluvium and fan deposits of silty sand, channel gravel, rounded pebbles, cobbles, and boulders (Bureau of Economic Geology 1979).

The dominant vegetation type is described as Creosotebush-Lechuguilla Shrub. Commonly associated plant species consist of mesquite (*Prosopis glandulosa*), yucca (*Yucca sp.*), lotebush (*Ziziphus obtusifolia*), ocotillo (*Fouquieria splendens*), javelina bush (*Condalia ericoides*), catclaw (*Acacia greggii*), white-thorn acacia (*Acacia constricta*), whitebrush (*Aloysia gratissima*), ceniza (*Leucophyllum frutescens*), althorn (*Koeberlinia spinosa*), guayacan (*Porlieria angustifolia*), pricklypear (*Opuntia spp.*), pitaya (*Echinocereus enneacanthus*), tasajillo (*O. leptocaulis*), ratany (*K. glandulosa*), skeletonleaf goldeneye (*Viguiera stenoloba*), tarbush (*Flourensia cernua*), mariola (*Parthenium incanum*), chino grama (*Bouteloua ramosa*), black grama (*B. eriopoda*), and fluffgrass (McMahan, Frye, and Brown 1984).

Much of the ROW adjacent to the roadway is regularly maintained as part of the roadway shoulder, and thus is devoid of vegetation. A few opportunistic grasses, forbs, and seasonal wildflower species have reestablished themselves in these disturbed areas. Approximately 6 acres (2.4 hectares) of remnant patches of native vegetation, matching the description above, are present on the numerous outcrops and hillsides in the ROW that are not regularly maintained.

Major stream crossings within the project limits include the Long Draw (three separate crossings, I, II, and III), Well Creek, Tres Cuevas Draw, Comanche Creek and Trocha de Agua. In

addition, there are approximately 37 smaller water crossings. Within the right-of-way, these stream crossings are devoid of mature woody vegetation due to regular ROW maintenance activities, primarily grading, which occurs after storm events to remove debris and to reestablish the road shoulder. Vegetation in these areas consists of occasional opportunistic shrubs such as mesquite and saltcedar (*Tamarix ramosissima*), forbs, seasonal wildflowers, and grasses. Woody vegetation adjacent to the right-of-way at the crossings consists primarily of mesquite, creosote bush, saltcedar, and occasional desert willow (*Chilopsis linearis*).

## Land Use

Brewster County, Texas, is one of the driest and most sparsely populated regions in the United States. Ranching, mining, and tourism have been and continue to be the economic mainstays of the region. The area surrounding Terlingua and Lajitas, including FM 170, has experienced the greatest amount of disturbance due to past and present land use (McKinney 1998). Lajitas has an estimated permanent population of 150. Terlingua has an estimated permanent population of 250. The land bordering FM 170 within the project limits is rural in nature, and is primarily undeveloped rangeland with widely dispersed privately owned ranches and tourist destinations.

The area has experienced economic growth and development since 1979, but most of it has been minor in scale and focused within the Lajitas-Terlingua corridor. No public roads on new locations have been built in the area since the 1950s, and the existing FM 170 remains a two-lane road. Population census data show very low population growth levels over the past few decades. In 1990, U.S. Census figures for Brewster County showed a total population of 8,681, 65 percent within the City of Alpine, and the remainder in the rest of Brewster County, including Terlingua (population 250) and Lajitas (population 150). In 2000, the population of Brewster County increased 2.5 percent to 8,866. Population size for the portions of Brewster County that include Terlingua and Lajitas grew by 1 percent between 1990 and 2000. The same rate of growth is expected between 2000 and 2030 (Brewster County Records, Office of Val Beard, County Judge, May 2003). In the Terlingua-Lajitas area, the habitat for Lloyd's Mariposa cactus has been destroyed by activities associated with mining, poaching, sales of the plant in the tourist and nursery trade, and off-road vehicles. The habitats in this area have the least likely chance of recovering because most economic/residential activity remains centered here (McKinney 1998).

## Effects of the Action

During construction, project activities may include the use of up to the 120-foot (36.6-meter) ROW for detour roads, clearing, grading (leveling), staging, excavating, stockpiling of materials, and equipment movement and storage. Efforts would be made to limit the areas of work where the entire 120-foot (36.6-meter) ROW would be needed. The proposed construction would impact approximately 3.5 acres (1.4 hectares) of existing vegetation and wildlife habitat in uplands and drainages. Approximately 0.406 acre (0.164 hectare) of this vegetation is located at the culvert and bridge locations.

Sparse grasses, desert scrub brush, forbs, and some small stands of common cacti will be the primary vegetation affected by the proposed construction. The existing habitats in the right of way will be affected primarily by the activities associated with widening the roadway by four feet, including the lane and shoulder expansion, and construction of culverts and bridges in the drainages. Those habitat areas in the direct path of construction will be destroyed.

Approximately 0.66 acre (0.27 hectare) of Lloyd's Mariposa cactus habitat will be converted to pavement and graded dirt shoulder. All Lloyd's Mariposa cactus plants within this habitat will be removed from the wild and preserved in captivity for propagation. A total of 100 Lloyd's Mariposa cactus plants will be removed from two populations, at least 3 from population 2 and 97 from population 1. These plants will likely survive; however, they will exist in greenhouse conditions.

All other Lloyd's Mariposa cactus plants in the ROW and outside of the ROW will be preserved. Measures to avoid impacts, such as designating staging areas away from Lloyd's Mariposa cactus habitat, educating contractors, and avoiding drawing attention to the Lloyd's Mariposa cactus will likely prevent the remaining cactus from being adversely affected from the road construction activities.

Although the proposed project would add to the amount of impervious surface in the area, it is unlikely that the proposed project will indirectly affect the Lloyd's mariposa cactus plants through changes in water infiltration as most of the plants are located upslope from the road bed. However, some plants may be lost to increased erosion on the slopes where they occur until the soils are stabilized.

As FM 170 would be rebuilt for safety reasons rather than to accommodate or promote added capacity, it is expected that the amount of traffic on the roadway would not increase as a result of the new construction. Thus, no effects are expected to Lloyd's mariposa cactus as a result of increased traffic due to the proposed project.

### **Cumulative Effects**

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Continued operation and maintenance of the ROW after construction has the potential to adversely affect the remaining populations of Lloyd's Mariposa cactus if maintenance workers are not aware of the need to avoid these plants. In addition, future excavation or clearing of the ROW for utility lines or other purposes in these areas may also have an adverse impact on the species. TxDOT has devised measures to further avoid these impacts, however, the possibility exists that utility company or maintenance workers may or may not know of or follow the proposed constraints. In addition, the proximity of the remaining plants to the roadway puts

them at risk for collection by poachers and destruction by random occurrences, such as car accidents and off-road vehicular and foot traffic.

Cumulative effects related to tourism and general population growth in the area have potential to impact the action area in the future. The scenic beauty and remoteness of the Big Bend Region will likely continue to draw tourists as it has in the past. Big Bend National Park, the Rio Grande, and the towns of Terlingua and Lajitas are the major tourist destinations. Over the past 10 years, substantial development has taken place at the Lajitas Resort that is located at the western terminus of the proposed project area. Development included construction of an airstrip, an 18-hole golf course, a hotel complex, an equestrian center, and a recreational vehicle park. Future expansion and development of the Lajitas Resort, if it were to occur, has potential to impact the habitat of Population 1 if these areas are used for resort expansion. No information from the Lajitas resort is currently available concerning future plans for growth.

Future development of properties along FM 170 between Terlingua and Lajitas for residential home sites, and expansion of other tourist facilities would spur population growth on the properties adjacent to the FM 170 ROW. Resulting construction of driveway entrances to tie in to FM 170 could adversely impact the species if they are built in the habitat areas. No site-specific information is available as to the likelihood of this occurring, however.

## **CONCLUSION**

After reviewing the current status of the Lloyd's Mariposa cactus, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the Lloyd's Mariposa cactus. No critical habitat has been designated for the Lloyd's Mariposa cactus. Therefore, none will be affected.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act, and Federal regulations pursuant to Section 4(d) of the Act prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

As discussed above, Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants is provided to the extent that the Act prohibits the removal and reduction to possession of Federally listed threatened or endangered plants on areas under Federal jurisdiction; the malicious damage of endangered plants on areas under Federal jurisdiction; or the removal, cutting, digging, damaging, or destruction of endangered plants on non-Federal areas in violation of any State law or regulation or in the course of any violation of a State criminal trespass law.

### **Amount or Extent of Take Anticipated**

The Service does not anticipate the proposed action will incidentally take any listed animal species.

### **Effect of the Take**

No take of any listed animal species is anticipated as a result of this proposed action.

### **Conservation Recommendations**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends implementing the following actions:

- I. All plants to be removed from the wild should be collected in accordance with the Service's controlled propagation policy.
- II. In the event any plants raised in captivity are returned to wild populations, they should not be returned to areas outside their historic range. Botanists with the Service are available to assist with reintroduction efforts.

In order for the Austin Fish and Wildlife Service Office to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

### **Re-initiation-Closing Statement**

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR Sec. 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that

causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions regarding this Opinion, please contact Jenny Wilson at (512) 490-0057, extension 231.

Sincerely,

/s/ Robert T. Pine

Robert T. Pine  
Supervisor

cc: Texas Department of Transportation  
U.S Army Corp of Engineers, Albuquerque District, El Paso Field, (Attn: Jim Mace)

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Figure 1.

